Ambient-temperature near-IR phosphorescence and potential applications of rhenium-oxo corroles

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Electronic supplementary information (ESI) available

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Figure S1. Absorption spectrum of Re[TPC](O) in toluene.

Figure S2. Absorption spectrum of Re[TpMePC](O) in toluene.
Figure S3. Absorption spectrum of Re[TpOMePC](O) in toluene.

Figure S4. Absorption spectrum of Re[TpFPC](O) in toluene.
Figure S5. Excitation spectrum of Re[TPC](O) in anoxic toluene ($\lambda_{em} = 770$ nm).

Figure S6. Excitation spectrum of Re[TpMePC](O) in anoxic toluene ($\lambda_{em} = 770$ nm).
Figure S7. Excitation spectrum of Re[TpOMePC](O) in anoxic toluene ($\lambda_{em} = 770$ nm).

Figure S8. Excitation spectrum of Re[TpFPC](O) in anoxic toluene ($\lambda_{em} = 770$ nm).
Figure S9. Emission spectrum of Re[TPC](O) in anoxic toluene ($\lambda_{\text{exc}} = 590$ nm).

Figure S10. Emission spectrum of Re[TpMePC](O) in anoxic toluene ($\lambda_{\text{exc}} = 590$ nm).
Figure S11. Emission spectrum of Re[TpOMePC](O) in anoxic toluene ($\lambda_{\text{exc}} = 590$ nm).

Figure S12. Emission spectrum of Re[TpFPC](O) in anoxic toluene ($\lambda_{\text{exc}} = 590$ nm).
Figure S13. Phosphorescence decay of Rhenium-Oxo Corroles in anoxic toluene ($\lambda_{\text{exc}} = 455$ nm).

Figure S14. Phosphorescence decay of Rhenium-Oxo Corroles in anoxic toluene ($\lambda_{\text{exc}} = 455$ nm).
Figure S15. Absorption spectra of Re[TpCF$_3$PC](O) in air-saturated toluene solution during irradiation with a high power 590-nm LED array.

Figure S16. Absorption spectra of Re[TPC](O) in air-saturated toluene solution during irradiation with a high power 590-nm LED array.
Figure S17. Absorption spectra of Re[TpMePC](O) in air-saturated toluene solution during irradiation with a high power 590-nm LED array.

Figure S18. Absorption spectra of Re[TpOMePC](O) in air-saturated toluene solution during irradiation with a high power 590-nm LED array.
Figure S19. Absorption spectra of Re[TpFPC](O) in air-saturated toluene solution during irradiation with a high power 590-nm LED array.

Figure S20. Decay time plots for the oxygen sensor based on Re[TpCF3PC](O) embedded into polystyrene.
Figure S21. Stern-Volmer plots for the oxygen sensor based on Re[TpCF₃PC](O) embedded into polystyrene.

Figure S22. Temperature dependence of the phosphorescence decay time in the absence of oxygen $\tau_0$ (left) and Stern-Volmer constant $K_{SV}$ (right). The lines represent linear fit.
Table S1. Oxygen sensing properties of the sensor based on Re[TpCF₃PC](O) embedded into polystyrene. (a)

<table>
<thead>
<tr>
<th>τ₀ at 5 °C, µs</th>
<th>τ₀ at 25 °C, µs</th>
<th>τ₀ at 45 °C, µs</th>
<th>dτ₀/dT at 25 °C, µs/K</th>
<th>KSV₁ at 5 °C, hPa⁻¹</th>
<th>KSV₁ at 25 °C, hPa⁻¹</th>
<th>KSV₁ at 45 °C, hPa⁻¹</th>
<th>dKSV₁/dT at 25 °C, %/K</th>
</tr>
</thead>
<tbody>
<tr>
<td>80.4</td>
<td>76.6</td>
<td>72.5</td>
<td>-0.26</td>
<td>0.046</td>
<td>0.056</td>
<td>0.066</td>
<td>0.89</td>
</tr>
</tbody>
</table>

(a) Non-linear fit according to two site model, eq. 1. Constant fit parameters: m = 0.076; f = 0.77 for all temperatures.

Figure S23. Schematic representation of the mechanism of upconversion based on triplet-triplet annihilation.
Figure S24. Emission spectrum of Solvent green 5 in toluene ($\lambda_{exc} = 400 \text{ nm}$).

Figure S25. Emission spectrum of Pt[TPTBP] in anoxic toluene ($\lambda_{exc} = 585 \text{ nm}$).